Additional Comments re Supp.

281258
281259

Easterling, Deborah

From: Easterling, Deborah
Sent: Friday, January 11, 2019 8:20 AM
To: 'Erick Karlen'
Subject: RE: Comments of Greenlots Regarding Duke's EV Program filed in Docket No. 2018-321-E & 2018-322-E

Good morning Mr. Karlen,

We will post the letter this morning. Thank you for letting us know.

Sincerely,

Deborah Easterling
Executive Assistant
Public Service Commission of South Carolina
803-896-5133
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From: Erick Karlen [mailto:ekarlen@greenlots.com]
Sent: Thursday, January 10, 2019 7:45 PM
To: PSC_Contact <Contact@psc.sc.gov>
Subject: Re: Comments of Greenlots Regarding Duke's EV Program filed in Docket No. 2018-321-E & 2018-322-E

Hi-

Wanted to follow up on this email submission from last month. It does not appear that these comments have been docketed.

Please kindly advise.

Thanks,

Erick
510.759.8948

From: Erick Karlen
Sent: Monday, December 10, 2018 2:53:27 PM
To: contact@psc.sc.gov
Cc: Thomas Ashley
Subject: Comments of Greenlots Regarding Duke's EV Program filed in Docket No. 2018-321-E & 2018-322-E

Hi-

Attached please find Greenlots' comments regarding Duke's proposed Transportation Electrification Program filed in Docket No. 2018-321-E and Docket No. 2018-322-E on October 10, 2018.

These comments build upon our prior letter of support dated November 2, 2018, and we request that this be included in any relevant future Commission action or decision-making, including any such actions that may require intervention.

Please kindly file this appropriately in the two relevant dockets noted.

Thanks,

Erick Karlen
Policy Advisor, Greenlots
www.greenlots.com
510.759.8948

December 10, 2018

-Docket No. 2018-321-E-
-Docket No. 2018-322-E-

The Honorable Jocelyn G. Boyd
Chief Clerk/Administrator
The Public Service Commission of South Carolina
101 Executive Center Drive, Suite 100
Columbia, SC 29210

RE: Comments of Greenlots Regarding Duke's Proposed Transportation Electrification Pilot

Dear Ms. Boyd,

Greenlots submits these comments to the Public Service Commission of South Carolina ("the Commission") in support of Duke Energy Progress, LLC's and Duke Energy Carolinas, LLC's (collectively, "the Company" or "Duke") proposed Transportation Electrification Program ("the program") filed in Docket No. 2018-321-E and Docket No. 2018-322-E on October 10, 2018. Building upon our prior letter of support dated November 2, 2018, we request that these comments be included in any relevant future Commission action or decision-making, including any such actions that may require intervention.

Greenlots is a leading provider of electric vehicle (EV) charging software and services committed to accelerating transportation electrification in South Carolina. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America, and an increasing percentage of the Level 2 infrastructure. Greenlots' smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic EV charging loads and respond to local and system conditions.

Introduction & Pilot Overview

Transportation electrification stands to bring a host of benefits to South Carolina and society at large. These include economic development and cost savings, environmental, human health, energy security, and grid resiliency benefits. In fact, if one looks only at the cost savings benefits from reduced electric bills and reduced vehicle operating costs, by 2050 South Carolina will realize cumulative net benefits from transportation electrification that will exceed $2.7 billion state-wide under a moderate EV adoption trajectory assumed by the U.S. Energy Information Administration.[1] This figure increases to $24 billion under an EV adoption trajectory that reduces light-duty greenhouse gas emissions by 70-80% from 2018 levels by 2050.[2]

[1] MJB&A, "Plug-in Electric Vehicle Cost-Benefit Analysis: South Carolina", June 2018, p. ii-iii. Available at: https://mjbradley.com/sites/default/files/SC%20PEV%20CB%20Analysis%20FINAL.pdf
[2] I.d.

These figures help illustrate that transportation electrification represents likely the single greatest opportunity to increase the utilization of the electric grid to the benefit of all ratepayers. These benefits will not happen automatically, however, and will require thoughtful and deliberate planning and programs to realize, especially if the state wishes to maximize the value presented by this opportunity. Duke's interest in addressing significant barriers to widespread transportation electrification in South Carolina, including a lack of accessible charging infrastructure, a lack of consumer awareness, and high upfront infrastructure costs, is therefore both appropriate and necessary.

Duke's proposed pilot programs represent a portfolio of modest targeted offerings to gain learnings to accelerate transportation electrification that leverages the Company's core competences and ability to help support and accelerate the market to the benefit of all utility customers. The programs are effectively designed to support consumers in realizing the benefits of EVs, efficiently integrate EV loads into the grid, and reduce persistent barriers to EV adoption.

The proposed Residential EV Charging Program both incentivizes the installation of smart, networked EV chargers to support EV drivers while providing for better integration of electric vehicle charging loads into the grid through utility management of home charging during defined hours. This will result in environmental benefits, economic benefits and grid utilization benefits that can ultimately benefit all ratepayers while accelerating the market.

The EV School Bus Charging Station Program and the EV Transit Bus Charging Station Program provides for financial support for the purchase of up to 30 electric school buses and 30 electric transit buses, which will help address equitable access to electric transportation and bring the benefits electric transportation to the state's schoolchildren. Additionally, the EV school bus program will evaluate the charging characteristics and usage patterns of electric school buses and test bidirectional power flow abilities of and the potential to use their batteries during times of high electric demand or during disaster recovery to the benefit of the grid.

Finally, and importantly, the DC Fast Charging Station Program will develop a critical, beginning level of public fast charging infrastructure throughout the state, installing up to 30 public DC fast chargers and addressing one of the most significant barriers to electric vehicle adoption and beginning to fill critical market gaps being left by the private sector. Indeed, the current lack of such public charging infrastructure can be described as a market failure. This proposed program will take essential steps towards accelerating this market, supporting EV drivers and consumer EV purchase decisions, while also providing critically undervalued maintenance and reliability benefits to this infrastructure via Duke's stewardship and operation.

Electric Vehicle Charging Market Overview

One of the most significant and challenging barriers to increased EV adoption is the lack of charging infrastructure, particularly public charging.[3] Unfortunately, a sustainable, competitive market in the deployment of public charging infrastructure is aspirational, and is unlikely to arise prior to the adoption of a critical mass of electric vehicles. This is primarily due to a lack of a business model for the ownership and operation of public charging stations based on sustainable revenues from charging activities, and this has thus far resulted in a fundamentally inadequate amount of private investment in such charging infrastructure. While there is market competition between a relatively small field of sellers of EV charging products and services to motivated investors/site hosts, there is not a competitive market for offering these services directly to drivers. This is despite significant private investment in companies that otherwise would have the ability to deploy this infrastructure, which instead tend to focus on easier-to-address or potentially more profitable market segments.

For example, in the residential context, an EV owner who needs a home charger will have no difficulty finding plenty of EVSE sellers and EVSE offerings to install in his or her garage. The same goes for a business that is motivated to purchase, own and operate EVSE on their premises as a value-added service or amenity to their customers and/or employees, perhaps to increase employee satisfaction, bolster their social/environmental responsibility, attract customers or otherwise differentiate themselves in the marketplace. Unfortunately however, the existence of a competitive market ends here.

Outside of these specific use cases there are many forms of public charging—chargers for which there are not motivated investors/buyers. This includes lower powered chargers at public parking spaces or parking garages of certain multi-unit dwellings, or higher-powered chargers in metro areas or key transportation corridors to facilitate every day and longer-range travel. This is EVSE deployed purely to provide charging services – chargers for provision of a charging service not in the context of offering an amenity or an additional value-added service.

For this second critical category, unfortunately a sustainable, competitive market is aspirational, and is unlikely to arise prior to the adoption of a critical mass of electric vehicles. This is primarily on account of a lack of a business model for the ownership and operation of public charging stations based on sustainable revenues from charging activities, and this has thus far resulted in a fundamentally inadequate amount of private investment in such charging infrastructure.

At the same time, many consumers disqualify EVs from their purchasing considerations due to the lack of charging infrastructure and the resulting concern commonly referred to as "range anxiety." This specific concern and the lack of public charging infrastructure is consistently cited

[3] International Council on Clean Transportation, "Emerging Best Practices for Electric Vehicle Infrastructure" p. iv. Available at: https://www.theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf

by drivers and studies a primary barrier to EV adoption. While the market is now seeing more EVs with longer ranges, many currently deployed EVs have batteries that can only support local driving, further compounding this issue. Even when EVs with 200+ mile ranges become more prevalent, this will put more pressure on DC fast charging (DCFC) infrastructure along corridors and in metros, the former which has some of the highest costs to develop and one of the most challenging business models. The end result is the fundamental economics simply not supporting sufficient private investment to adequately grow the infrastructure market to support current and future drivers and their purchasing decisions.

Beyond the critical psychological benefit of reducing range anxiety, as battery sizes and electric ranges continue to increase and multi-unit dwelling (MUD) residents adopt electric vehicles, there will be an increased need for "gas station model" fueling activity not just along corridors but also in strategic urban and rural community environments, further putting pressure on segment of the EVSE market that traditionally has not seen a sustainable business model. This strain will further increase with the market moving to higher and higher power DCFC which comes with even higher costs and greater grid integration challenges (while also presenting opportunities as discussed later).

Specific market sectors also face significant barriers in deploying sufficient infrastructure. In MUDs, split incentives and the absence of cost sharing structures between tenants and property owners severely limits opportunities for EVSE deployment. Workplaces or workplace landowners are often averse to the installation of EVSE due to costs and liability concerns. In disadvantaged communities, these barriers are even more significant, with this critical segment being severely underserved by the private EV charging service market.

The Utility Role in Addressing Market Barriers

When looked at as a whole, this particular market state, which currently can only be described as a market failure, is a classic situation warranting public investment and the involvement of regulated monopolies. At such a stage in the market, utility investment in charging infrastructure – including ownership and operation of charging stations – is an appropriate and necessary role for the utility to break the market through these barriers, and accelerating the market across most segments, supporting competition, and improving the environment for private investment.[4]

This should not be confused for anti-competitive behavior. Rather, utility investment in charging infrastructure, growing the installed infrastructure base, will help spark EV purchasing decisions and grow the total customer base, getting the market closer to an inflection point where asset utilization rates of charging infrastructure can attract greater private investment to sustain a

[4] See Natural Resources Defense Council, "Driving Out Pollution: How Utilities Can Accelerate the Market for Electric Vehicles", Section 2 "Utility Investment in Charging Infrastructure is Needed to Expand the Electric Vehicle Market". p. 7. Available at https://www.nrdc.org/sites/default/files/driving-out-pollution-report.pdf

healthy, competitive market. At the same time, it provides needed market opportunities for suppliers in the absence of motivated buyers across most market segments, incentivizing competition and product innovation through utility procurement programs.

A deep and flexible utility role is essential to leverage its full involvement, assets and capabilities to accelerate transportation electrification and best position ratepayers to realize the full array of benefits this technology transformation can bring.[5] Whether this be the ownership of charging infrastructure or the development of rates that send better price signals to manage EV loads in ways that best support the needs of the grid, or minimizing or avoiding unnecessary grid investments by knowing where, when and how EV loads are interacting with distribution infrastructure; these and many other benefits will not be fully realized without deep and active participation by the utility.

Moreover, the nature of EVSE assets, being a natural extension of existing utility infrastructure, with similar hardware, features and capabilities as for example smart meters, fit very well within the core competencies and capabilities of utilities. This is particularly true with respect to ownership and maintenance of widely-dispersed, long-lived electricity-dispensing and metering equipment, and ensuring the safety and reliability of those assets. Having existing qualified field personnel allows for this, while purchasing economics to lower costs and having relevant system, business process, software and customer service expertise and capabilities further aligns naturally with the demands of successful EVSE deployment. Utilities are also well positioned to support the hiring and training of field support personnel and other key roles necessary execute the electrification of transportation.

Utility programs also by and large can extend the same type of reliability to EV charging infrastructure that ratepayers expect for all other utility services. A badly undervalued aspect of the EV charging equipment and services market is the cost associated with keeping equipment up and running and repairing or replacing it quickly if and when it encounters an issue. While early adopters of EVs may tolerate the often-poor reliability associated with much of the charging infrastructure that is deployed today, the broader market likely will not. Moreover, as the demands on EVSE deployments increase with more EV drivers on the road, many of the factors that lead to poor reliability may compound. This therefore represents a key barrier to widespread transportation electrification. To achieve the level of reliability drivers currently experience from traditional fueling stations, much more needs to be done. Utility program investment offers opportunity for electric vehicle service providers to benefit from a more accurately valued maintenance service that will not only improve reliability of EVSE within the utility program, but will likely extend beyond the bounds of the program to benefit EV charging equipment and service providers in the market as a whole.

[5] I.d. at p. 9.

Without an integrated, holistic approach developed by the utility, the ability of the EV consumer to engage suffers, with the EV charging space fragmented by geography, market segment, business structure and sales priorities. The end consumer (the driver) can become frustrated as a result of this fragmented and disparate approach. However, the utility stands in a unique and powerful position to help resolve these issues with a more comprehensive, structured and rational approach that overcomes barriers to market growth and ensures and maximizes benefits to all ratepayers.[6]

Without prescribing a specific role for the utility within the context of market accelerator, Greenlots believes that providing flexibility and appropriate incentives for the utility, including earnings adjustment mechanisms (EAMs) and recovery in rates of prudently incurred costs, to self-select the role(s) that best fit(s) its distribution system, customers, and future planning is essential to helping motivate the utility to be excited about its involvement in accelerating the market.

In summary, however, it is clear that the deeper the utility role, the greater the benefit to ratepayers, EV drivers, auto manufacturers, and indeed – EV charging companies. Ratepayers benefit in many ways, but the ability of the utility to minimize costs associated with unmanaged charging and maximize positive load shape is key to realize the greatest depth of benefits to ratepayers. This implicates active management and visibility, though utility management does not necessarily require asset ownership.

EV drivers benefit the most from the deployment of an adequate volume of charging infrastructure that is well maintained and reasonably priced. These are implicit characteristics of infrastructure owned and/or otherwise managed by utilities. Critically, this infrastructure deployment would allow the barrier of range anxiety to be eliminated. Auto manufacturers are focused on selling vehicles and with a few exceptions have not made meaningful investments in charging infrastructure. The existing lack of infrastructure has been a primary barrier for auto manufacturers to assess demand for electric vehicles and has slowed down investment, planning, and development in electric models. An adequate volume of charging infrastructure means that auto manufacturers can focus on non-infrastructure barriers such as model availability, dealership training, marketing, etc.

Charging software and hardware providers benefit directly from utility ownership by competing for the utility's business in the procurement of charging products and services. Direct utility procurement results in a marketplace with decisions based upon features, functions, track record, and price, allowing big and small players to participate with a leveled playing field. As discussed later in greater detail, the adoption of open standards maximizes the initial and ongoing competition for both hardware and software products and services. Beyond direct utility

[6] Edison Electric Institute, "Accelerating Electric Vehicle Adoption", p. 5-6. Available at: http://www.eei.org/issuesandpolicy/electrictransportation/Documents/Accelerating_EV_Adoption_final_Feb2018.pdf

procurement, other market participants benefit from improved economics associated with investing in charging infrastructure, as the utility investment accelerates EV adoption, thereby increasing utilization of non-utility infrastructure. This results in increased opportunities for all market participants, importantly positioned utility investment—including utility ownership—as a market catalyst, rather than a market constraint.

Electric Vehicle Market Overview

The upfront cost of electric vehicles (EV) is declining rapidly, primarily due to a decline in battery costs and technology improvements. Experts predict that EVs will reach cost parity with conventional vehicles by 2025 and Greenlots tends to expect this to happen more quickly.[7] Indeed, factoring in reduced fuel and maintenance costs, many EVs have already reached cost parity for their owners.

There are a number of financial mechanisms that have been deployed to try to reduce the upfront cost of EVs, including a federal tax credit up to $7,500 and various state incentives (although none have been implemented to date in South Carolina). Although the Trump Administration has threatened to repeal the tax credit, an act of Congress is needed to make that change; an incoming Democratic-controlled House makes tax credit removal unlikely. However, the tax credit is currently structured to expire for each manufacturer after 200,000 vehicles are sold – Tesla has reached that threshold and GM is expected to reach that number by the end of the year. Various proposals have emerged to extend or modify the tax credit (e.g., Electric Cars Act of 2018).[8]

Although EVs have lower total cost of ownership (due to reduced maintenance costs, cheaper fuel in the form of electricity, etc.), most prospective vehicle buyers/lessees are most concerned with the upfront sticker price. In South Carolina, EV drivers need to pay the standard vehicle registration fee as well as a $120 biennial vehicle registration fee (pursuant to H.B. 3516)9; this fee structure further disincentives drivers from selecting an EV.

There are more than 50 EV makes and models currently available in the US, but only a handful of these vehicles are actually available for purchase in South Carolina.[10,11] Because of the way California's emissions waiver is designed, vehicle manufacturers receive credits for vehicles sold in California – and other states which have adopted California's standard (so-called 'Section 177 states'); South Carolina has not adopted California's standard. Because auto manufacturers lack incentive to sell vehicles in South Carolina, there is relatively poor vehicle model availability and an underdeveloped EV market in the state.

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[7] https://www.bloomberg.com/news/articles/2018-03-22/electric-cars-may-be-cheaper-than-gas-guzzlers-in-seven-years
[8] https://www.merkley.senate.gov/news/press-releases/merkley-heinrich-cortez-masto-introduce-legislation-to-extend-electric-vehicle-tax-credit-for-10-years
[9] https://www.scstatehouse.gov/sess122_2017-2018/bills/3516.htm
[10] https://afdc.energy.gov/vehicles/electric_availability.html
[11] https://www.greencarreports.com/news/1109217_which-states-follow-californias-emission-and-zero-emission-vehicle-rules

South Carolina boasts over 66,000 auto manufacturing jobs, and includes more than 400 suppliers and other automotive ecosystem companies including Mercedes, Volvo, and BMW.[12] A focus on retooling existing manufacturing plants toward EVs – where the market is clearly heading – can help avoid some of the issues currently facing GM, which is shuttering factories because of changing market trends.[13] Focusing on building vehicles for the future can help preserve employment, good paying jobs, and induce employment in surrounding communities, as well as create a thriving and resilient employment landscape for generations to come. This represents an opportunity for South Carolina to be a market leader, and help push innovative technology to the fore.

EV Driver Charging Options and Choice

The fundamental and well documented lack of investment – both public and private – in EV charging infrastructure, which is the primary barrier to EV adoption by buyers familiar with EVs, has, in short, forced EV drivers to be takers of and captive to very limited charging options. At this stage of the market, captivity to limited optionality is most concerning from a geographic standpoint – there are simply too few places for drivers to go to charge.

Especially for public charging, the fundamental economics simply do not currently support sufficient private investment to get the market to where it needs to be to support current and future drivers and their purchasing decisions sufficiently.

The degree of captivity can vary somewhat depending on location and use case however. In metropolitan contexts for example, there may be more options to choose from and a greater opportunity to exercise that choice. For higher powered charging along transportation corridors that facilitate longer range travel, however, it is common that there is but a single charging option for a significant portion of that corridor. The increase in market availability of EVs with larger battery capacities that can facilitate longer range travel will increasingly put pressure on this segment of the market, which already suffers from limited investment and therefore limited choice.

From a driver's standpoint, being captive to one set of EV charging options – say a utility network – is not inherently negative, and indeed, may be a strong positive if the charging experience is enjoyable. For the most part, a driver makes charging decisions based on geographic and temporal logistics, not price. As long as there is adequate coverage with a limited number of providers offering good service at reasonable prices, drivers will largely be satisfied. An eventual optionality to make decisions based on price, brand loyalty, etc. would indicate that the business

[12] https://www.postandcourier.com/business/report-south-carolina-among-states-chasing-job-auto-plant/article_a4e5b340-7d34-11e7-91b2-f72a89a1559b.html
[13] https://www.nytimes.com/2018/11/26/business/general-motors-cutbacks.html

model for private investment has improved, but would not necessarily create a better experience for drivers.

The Imperative of Open Standards & Interoperability

This is a critical detail for the Commission to factor as it considers transportation electrification generally, and as it reviews utility filings going forward. Many of the chargers deployed today operate on proprietary networks and software, the implications of which become increasingly dire to ratepayers and the public as more and more infrastructure is deployed. Importantly, this consideration is separate and distinct from driver roaming or payment network interoperability considerations relevant to the ability of a driver to access a given charging station.

Proprietary networks unjustifiably risk that publically-funded infrastructure investments become stranded assets that don't meet evolving needs, and that vendor lock-in results in higher operating costs, all while stifling innovation and competition across both charging hardware and software. The Commission can take action to help avoid these undesirable outcomes by encouraging or even requiring utilities and developers as part of any ratepayer-funded program to fully utilize open standards such as Open Charge Point Protocol ("OCPP") and Open ADR in order to best serve EV drivers, ratepayers and the evolving market.

Utilities can implement such a program having a vendor manage the charging station network in its territory using OCPP. Such a network would support a truly competitive charging station hardware market, where companies compete to sell hardware to customers, with the charging network manager having access to their stations via OCPP. This is analogous to approaches to selecting platforms for managing and integrating DR programs and DER optimization into distribution system operations, though sometimes those platforms are not based upon open communications.

This approach has a number of advantages. First, the utility will have the data and communications ability it needs to manage the charging stations for the ratepayer's benefit—and it won't have to try to access proprietary networks on potentially difficult commercial terms or through less than direct communications. Second, the approach promotes competition across the spectrum. Hardware companies can compete at the point of initial decision-making, but also at any point forward. To the extent that a utility wants to switch or evolve its network provider, it can because the stations in the network will be accessible via an open protocol, therefore there is both initial and ongoing competition for a software platform or software services. Third, it reduces the risk of utility programs having funded stranded assets in the field. This is not just about if or when a company operating a proprietary charging station ceases operations – or fails to maintain its stations – it is also about the pace of innovation and whether a network is providing the features and services desired. If the station utilizes OCPP, it is easy to continue to access that station and operate it in the former scenario, and easy to switch network providers if the incumbent is not delivering what the utility desires or what utility customers require.

With such a network in place, significant complexity and risk is eliminated for the utility and ratepayers while still allowing maximum programmatic, vendor, site host and consumer choice. The adoption of open protocols and standards is essential to support transportation electrification, grow the market for EVs and EV charging products and services, enhance the driver/customer experience, integrate with the electricity system, and lower the cost of ownership of both EVs and EV charging infrastructure. The proliferation of open standards and communication methodologies provides a platform and ecosystem for innovation and customer choice that is critical to guarding against stranded assets and protecting the prudency of ratepayer investments.

Pilots and a Path Forward to Address Market Barriers

Greenlots is a strong supporter of scaling the market for electric vehicles and electric vehicle charging products and services as quickly as possible, and frequently comments that it's time to move beyond pilots to scaled programs. While we feel the same here, we recognize the need for foundational pilots in South Carolina to build a base of knowledge, data, and positive customer experience to allow decision-makers to make more informed decisions about how to support and scale these markets.

There are a growing number of pilots around the country that are producing helpful data and learnings. In part due to the support of market participants such as Greenlots, we are seeing growing impetus to ensure that pilots have mechanisms to bridge to scaled programs. This is critical to avoid slowdowns or gaps in funding or programs. It is also critical to demonstrate support for the vehicle electrification efforts of South Carolina's significant auto manufacturing industry, and therefore also the state's economy as a whole. While supporting the instant pilots, we are hopeful that the Commission will encourage and support additional programs before the conclusion of the pilots. This should not be read to confuse or complicate the decision-making process.

The universal observation of these pilots is that they have been critical to the stakeholder and decision-making process around a new technology space that is often subject to market misperceptions around both vehicles and infrastructure. Given the average lifespan of a new vehicle, which is over a decade, the costs and missed opportunities associated with waiting on or delaying transportation electrification efforts compounds as time goes by, due to the significant technology lock-in period for each new vehicle. To realize and maximize these benefits and not fall behind other states, a sense of urgency is appropriate in considering South Carolina's path forward.

For these reasons and with the comments offered, Greenlots supports and respectfully requests that the Commission approve Duke's proposed pilot programs. We look forward to continued

engagement in efforts supporting transportation electrification in South Carolina, and we thank the Commission for consideration of these comments.

Respectfully submitted,

Thomas Ashley
VP, Policy